

## **ABSTRACT**

Microfluidic devices having a diffusion-aided system for loading samples into the microfluidic device are provided. Methods of gas-venting a microfluidic device through a non-porous, gas permeable material sealing cover layer, for example, during liquid sample loading, are also provided. The non-porous, gas-permeable material can be, for example, a polysiloxane, for example, polydimethylsiloxane.